AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (Previously Presented) A device for thermal overload protection of an electrical device, particularly an electric motor (M), the device comprising means for measuring at least one load current supplied to the electrical device (M), means for calculating the thermal load on the electrical device on the basis of said at least one load current, and means (S2) for disconnecting a current supply (L1, L2, L3) when the thermal load reaches a given threshold level, wherein said means for calculating the thermal load on the electrical device comprise a processor system employing X-bit, preferably X=32, fixed-point arithmetic, the system comprising means for scaling the measured current into unit values to a range of 0 to Y, wherein Y represents Y/100% of a nominal current, and means for calculating the thermal load using a mathematical equation that, together with its operands, is programmed into the microprocessor system structured such that a result or a provisional result never exceeds the X-bit value.

2. (Previously Presented) A device as claimed in claim 1, wherein the mathematical equation is

$$\Theta_k = \Delta T * \frac{i^2}{C} + \left(1 - \frac{\Delta T}{R * C}\right) * \Theta_{k-1}$$

wherein

Θ = thermal load

ΔT = interval for thermal load calculation

R = cooling factor of electrical device

C = trip-class factor.

3. (Previously Presented) A device as claimed in claim 2, wherein one or

more of following operand values are used

Θ = 0 to 200% preferably corresponding to a value range of 0 to 2.4

ΔT = interval for thermal load calculation in milliseconds

R = cooling factor of electrical device in a range of 1 to 10

C = trip-class factor

i = measured current.

4. (Previously Presented) A device as claimed in claim 1, wherein the mathematical equation that, together with its operands, is structured such that the result or the provisional result of the calculation of the thermal load never exceeds the 32-bit value is

$$thRes = ((\Delta T*(i^2/C)+ROUNDING)/MSEC) + (((((MSEC*SCALING)-((\Delta T*SCALING)/(R*C)))/SPART1)*th)/SPART2) + thFract$$

wherein

thRes = thermal load,

ΔT = interval for thermal load calculation

R = cooling factor of electrical device

C = trip-class factor

i = measured current scaled into unit value

ROUNDING = rounding factor

MSEC = time unit scaling

SCALING = accuracy scaling

SPART1 = partial scaling

SPART2 = partial scaling

thFract = thermal load thRes of previous calculation divided by a constant.

5. (Previously Presented) A device as claimed in claim 4, wherein one or

more of the following operand values are used

thRes = 0 to 200% preferably corresponding to a value range of 0 to 24000

ΔT = interval for thermal load calculation in milliseconds

R = 1 to 10

i = measured current scaled into a unit value between 0 and 65000, corresponding to 0 to 650% of nominal current,

ROUNDING = 500

MSEC = 1000

SCALING = 10000

SPART1 = SCALING / 10

SPART2 = SCALING / 100

thFract = thRes of previous calculation divided by constant SCALING.

6. (Previously Presented) A device as claimed in claim 3, wherein C is trip-class factor t_6 multiplied by a constant, preferably 29.5, or calculated by the formula $(1/k) * Te * (Ia/In)^2$, wherein Ia = starting current, In = nominal current, Te = allowed starting time and k = constant, preferably k = 1.22.

7. (Previously Presented) A method for thermal overload protection of an electrical device, particularly an electric motor, the method comprising

measuring at least one load current supplied to the electrical device,

calculating the thermal load on the electrical device on the basis of said at least one load current, and

interrupting current supply to the electrical device when the thermal load reaches a given threshold level, comprising

scaling the measured current into a unit value to a range of 0 to Y, wherein Y represents Y/100% of a nominal current,

calculating the thermal load on the electrical device using an X-bit, preferably X=32, processor system employing fixed-point arithmetic, wherein a mathematical

equation for thermal load is programmed structured such that a result or a provisional result never exceeds the X-bit value.

8. (Previously Presented) A method as claimed in claim 7, comprising the mathematical equation being

$$\Theta_k = \Delta T * \frac{i^2}{C} + \left(1 - \frac{\Delta T}{R * C}\right) * \Theta_{k-1}$$

wherein

Θ = thermal load, preferably 0 to 200% preferably corresponding to a value range of 0 to 2.4

ΔT = interval for thermal load calculation, preferably in milliseconds

R = cooling factor of electrical device, preferably 1 to 10

C = trip-class factor

i = measured current.

9. (Previously Presented) A method as claimed in claim 7, comprising the mathematical equation that, together with its operands, is structured such that the result or the provisional result of the calculation of the thermal load never exceeds the 32-bit value, being

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thRes =((ΔT*(i²/C)+ROUNDING)/MSEC)
+(((((MSEC*SCALING)-((ΔT*SCALING)/(R*C)))/SPART1)*th)/SPART2)
+thFract
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wherein

thRes = thermal load,

ΔT = interval for thermal load calculation

R = cooling factor of electrical device

C = trip-class factor

i = measured current scaled into unit value

ROUNDING = rounding factor

MSEC = time unit scaling

SCALING = accuracy scaling

SPART1 = partial scaling

SPART2 = partial scaling

thFract = thermal load thRes of previous calculation divided by a constant.

10. (Previously Presented) A method as claimed in claim 9, comprising using one or more of following operand values

thRes = 0 to 200% preferably corresponding to a value range of 0 to 24000

ΔT = interval for thermal load calculation in milliseconds

R = 1 to 10

i = measured current scaled into a unit value between 0 and 65000, corresponding to 0 to 650% of nominal current,

ROUNDING = 500

MSEC = 1000

SCALING = 10000

SPART1 = SCALING / 10

SPART2 = SCALING / 100

thFract = thRes of previous calculation divided by constant SCALING.

11. (Previously Presented) A method as claimed in claim 8, comprising C being trip-class factor t_6 multiplied by a constant, preferably 29.5, or calculated by the formula (1/k) * Te * $(Ia/In)^2$, wherein Ia = starting current, In = nominal current, Te = allowed starting time and k = constant, preferably k = 1.22.

12. (Previously Presented) A device as claimed in claim 2, wherein the mathematical equation that, together with its operands, is structured such that the result or the provisional result of the calculation of the thermal load never exceeds the 32-bit value is

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thRes =((ΔT*(i²/C)+ROUNDING)/MSEC)
+(((((MSEC*SCALING)-((ΔT*SCALING)/(R*C)))/SPART1)*th)/SPART2)
+thFract
```

wherein

thRes = thermal load,

ΔT = interval for thermal load calculation

R = cooling factor of electrical device

C = trip-class factor

i = measured current scaled into unit value

ROUNDING = rounding factor

MSEC = time unit scaling

SCALING = accuracy scaling

SPART1 = partial scaling

SPART2 = partial scaling

thFract = thermal load thRes of previous calculation divided by a constant.

13. (Previously Presented) A device as claimed in claim 3, wherein the mathematical equation that, together with its operands, is structured such that the result or the provisional result of the calculation of the thermal load never exceeds the 32-bit value is

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thRes =((ΔT*(i²/C)+ROUNDING)/MSEC)
+(((((MSEC*SCALING)-((ΔT*SCALING)/(R*C)))/SPART1)*th)/SPART2)
+thFract
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wherein

thRes = thermal load,

ΔT = interval for thermal load calculation

R = cooling factor of electrical device

C = trip-class factor

i = measured current scaled into unit value

ROUNDING = rounding factor

MSEC = time unit scaling

SCALING = accuracy scaling

SPART1 = partial scaling

SPART2 = partial scaling

thFract = thermal load thRes of previous calculation divided by a constant.

14. (New) A device as claimed in claim 4, wherein C is trip-class factor t_6 multiplied by a constant, preferably 29.5, or calculated by the formula (1/k) * Te * $(Ia/In)^2$, wherein Ia = starting current, In = nominal current, Te = allowed starting time and k = constant, preferably k = 1.22.

15. (New) A device as claimed in claim 5, wherein C is trip-class factor t_6 multiplied by a constant, preferably 29.5, or calculated by the formula (1/k) * Te * $(Ia/In)^2$, wherein Ia = starting current, In = nominal current, Te = allowed starting time and k = constant, preferably k = 1.22.

16. (New) A method as claimed in claim 8, comprising the mathematical equation that, together with its operands, is structured such that the result or the provisional result of the calculation of the thermal load never exceeds the 32-bit value, being

$$thRes = ((\Delta T * (i^2/C) + ROUNDING)/MSEC) + ((((MSEC*SCALING) - ((\Delta T*SCALING)/(R*C)))/SPART1)*th)/SPART2) + thFract$$

wherein

thRes = thermal load,

ΔT = interval for thermal load calculation

R = cooling factor of electrical device

C = trip-class factor

i = measured current scaled into unit value

ROUNDING = rounding factor

MSEC = time unit scaling

SCALING = accuracy scaling

SPART1 = partial scaling

SPART2 = partial scaling

thFract = thermal load thRes of previous calculation divided by a constant.

17. (Previously Presented) A method as claimed in claim 9, comprising C being trip-class factor t_6 multiplied by a constant, preferably 29.5, or calculated by the formula (1/k) * Te * $(Ia/In)^2$, wherein Ia = starting current, In = nominal current, Te = allowed starting time and k = constant, preferably k = 1.22.

18. (Previously Presented) A method as claimed in claim 10, comprising C being trip-class factor t_6 multiplied by a constant, preferably 29.5, or calculated by the formula (1/k) * Te * $(Ia/In)^2$, wherein Ia = starting current, In = nominal current, Te = allowed starting time and k = constant, preferably k = 1.22.